

Supporting slides for Lecture 7 – How do we stomach our food?



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gastric acid blockade.



@UoLmedicine

School of Medicine

Parietal cell transport processes for HCI secretion



High acid suppression using 'antacids'



reflux oesophagitis "heart burn"



Peptic ulcer



Commercial Antacids Use A Variety of Chemicals

*Bicarbonate - based antacids: Alka Seltzer

 $NaHCO_3 + \underline{1}HCl \rightarrow NaCl + H_2CO_3$ $H_2CO_3 \rightarrow H_2O + CO_2$

Calcium - based antacids: Tums, Rennies

 $CaCO_3 + \underline{2}HCl \rightarrow CaCl_2 + H_2CO_3$

*Aluminum - based antacids: Maalox, Mylanta

 $Al(OH)_3 + \underline{3}HCl \rightarrow AlCl_3 + 3H_2O$

*Magnesium - based antacids: Mylanta, Milk of Magnesia

 $Mg(OH)_2 + 2HCl \rightarrow MgCl_2 + 2H_2O$





History of H₂ receptor antagonists

THE HISTAMINE H2-RECEPTOR ANTAGONISTS

GASTROENTEROLOGY 78:620-625, 1980

HISTORICAL SERIES

Reminiscences of the Development of Cimetidine

WILLIAM A. M. DUNCAN and MICHAEL E. PARSONS Imperial Chemical Industries, Ltd., Alderley Park, Macclesfield, Cheshire, United Kingdom, and Smith Kline and French Research Ltd., Welwyn Garden City, Herts, United Kingdom





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HN



CH₂CH₂NHCNH₃

+NH2

SK



Introduced 1976/77



Development of the first PPI



Figure: Intravenous injection of radiolabelled Omeprazole targets to the parietal cell of the gastric mucosa



Introduced in 1989

- Omeprazole was the first PPI, followed by pantoprazole, lansoprazole and rabeprazole
- PPI is a prodrug activated by acid and then binds covalently to the gastric H⁺, K⁺-ATPase via disulphide bond.
- Cys813 is the primary site responsible for the inhibition of acid pump enzyme, where PPIs bind.